

The Long-Term Effect of Tai Chi Exercise on Exercise Self Efficacy and Self-Perceived Health Status in the Elderly

Han-Cheol Kim¹, Il-Myeong Kim² and Sung-Woon Kim^{3*}

¹Department of Special Physical Education, Yeungnam University, Korea;
younghc@hanmail.net

²Department of of Elementary Special Education, Kwangju women's University, Korea;
ilmyeong@hanmail.net

³Department. of Physical Education, Kyungpook National University, Korea;
centhope@hanmail.net

Abstract

Background/Objectives: The purpose of this study was to examine the long-term effect of Tai Chi exercise on exercise self-efficacy and self-perceived health status in the elderly. **Methods/Statistical Analysis:** Sixty older adults were participated in this study. Their ages ranged from 70 to 75, with a mean age of 72.4 years. The participants were randomly assigned to one of two experimental conditions: (1) tai chi exercises group (n=30), (2) control group (n=30). Data was analyzed using two-way Analysis Of Variances (ANOVAs) with repeated measures of groups (tai chi exercise group and control group) and time (pre-test and post-test). Dependent variables were exercise self-efficacy and self-perceived health status. **Findings:** The result of this study indicated tai chi exercise group had a significantly higher score than control group in exercise self-efficacy and perceived health status. **Applications/ Improvement:** It was found that tai chi exercise helped to improve the exercise self-efficacy and the perceived health status in the elderly.

Keywords: Elderly, Exercise Self-Efficacy, Self-Perceived Health Status, Tai Chi Exercise

1. Introduction

With Korea fast becoming an aging society, medical costs associated with geriatric diseases (mostly affecting persons over 65 years of age) recently comprised 36.7% of total medical costs; this will increase further, according to the Korea Health Insurance Review & Assessment Service¹. As such, the increased population with geriatric diseases incurs the social problem of increasing national medical costs^{2,3}. Therefore, a diverse approach is required for health promotion along with geriatric disease prevention to ensure that the elderly can maintain humane

lives, increase their quality of life, and decrease the burden associated with increasing medical costs in an aging society.

Normally, physical problems of the elderly as they age have a close relationship to their stamina and exercise capacity, which are directly related to their quality of life. Therefore, independent maintenance or health improvement by the elderly themselves has become a very important task⁴. According to studies on the elderly's physical activities and their psychological benefits⁵⁻¹¹, exercise participation by the elderly is beneficial to bodily health by improving physical abilities and to psychologi-

*Author for correspondence

cal stability through positive mindsets that ease negativity such as daily uncertainty, stress, sense of loss, or depression. However, despite such positive effects of exercise, the Ministry of Health and Welfare¹² asserted that only 33.8% of the elderly engaged in regular exercise; moreover,¹³ reported that among the health promotion activities completed by the elderly, a below-average score for exercise was shown. Thus, an appropriate strategy for intervention is required to improve elderly exercise.

Recently, researchers¹⁴⁻¹⁶ asserted that Tai Chi (TC) is an intervention strategy to improve elderly exercise; it can be easily implemented regardless of time and place and is an effective exercise that can positively affect the general physique of the elder¹⁷ asserted that TC is a low-intensity traditional Chinese martial art focused on health improvement composed of elegant and slow moves; it is fun in its pursuit of diverse and changing moves and appropriate for the elderly because it does not require specific facilities or equipment. Other researchers^{18,19} asserted that TC was a type of exercise required for the elderly since it increased the security and focus of both the body and the mind and decreased levels of tension, stress, depression, anger, fatigue, confusion, and anxiety. As such, TC is a good form of exercise for health improvement of the elderly.

Recent studies²⁰⁻²² asserted that TC exercise has a positive influence on elderly self-efficacy. Self-efficacy is the belief that an individual will be able to successfully execute the activities required for certain results²³. Improved self-efficacy from social activity participation through physical activities such as TC, as well as maintaining interpersonal relationships, become important elements in elderly life from the perspective of life quality. Therefore, many researchers²⁴⁻²⁷ are striving to illuminate the relationship between self-efficacy and exercise through participation in elderly exercise programs. The studies that suggested self-efficacy as an effect after exercise intervention for the elderly^{28,29} asserted that engaging in exercise led the elderly to feel confident, leading to higher self-efficacy. As such, self-efficacy is an important factor in healthy behaviors and has a positive influence on elderly lives.

Moreover, recent studies^{30,31} asserted that TC exercise has a positive influence on the self-perceived health status of the elderly. Subjective health is a subjective determination of individual health; Ware³² asserted that this assessment is made by comprehensively considering psy-

chological, physical, and social aspects. Specifically, when subjective health is good, life satisfaction is higher; as such, it is an important factor determining life quality³³. Moreover, people who consistently participate in physical exercise have a high perception of subjective health³⁴; asserted that participating in physical activities is strongly related to elderly life quality since there is a significant correlation between subjective and actual health. Therefore, the more positive the perception of subjective health is, the higher the life quality of the elderly is. However, there are limited numbers of studies that illuminate the relationship between self-efficacy, which acts as an important factor in maintaining consistency of exercise by showing the elderly will to participate in activities, and perceived level of health, which is an important factor determining life quality. Moreover, most studies of the elderly face difficulty collecting participants, leading to a lack of research on large population groups. Although there are many very recent studies that studied health-related variables for the elderly through a diverse range of exercise programs, the majority of these studies conducted short-term exercise programs lasting 8–12 weeks with elderly participants over 60 years of age; in particular, studies that have examined elderly participants over 70 years of age, who face radical declines in muscular strength and muscle endurance, are even more limited.

The purpose of this study was to examine the long-term effect of Tai Chi exercise on exercise self-efficacy and self-perceived health status in the elderly over 70 years of age.

2. Methods

2.1 Participants

The participants of this study were the elderly residing in City D over 70 years of age selected using the stratified cluster random sampling method. The participants completed basic surveys and examinations to determine the presence of any abnormal physical conditions; elderly participants with blood pressure levels of 150/95 mmHg or below were selected. Sixty participants were divided randomly into 30 participants in the exercise group (73 years of age \pm 3.6) and 30 participants in the control group (72 years of age \pm 4.2). In this study, the researchers explained the study purpose and methods to the participants, after which informed consent was obtained.

The consent clarified that the personal information obtained through this study would not be used for any purposes other than for this study, that the participants autonomously and independently took part, and that the participants could withdraw at any point if they did not wish to participate.

2.1 Experiment Process and Measurement Methods

2.1.1 Experiment Process

The participants of this study were gathered through advertisements; they utilized the elderly care facilities or nursing homes in City D, were over the age of 70, understood the study purpose, were able to communicate and respond to interviews, and were willing to participate in this study. The participants gathered one week prior to the experiment for basic surveys and examinations to identify any physical abnormalities; the elderly that were selected had blood pressure levels below 150/95 mmHg. Then, the researchers explained the study purpose and methods and obtained consent from the participants. This was followed by a pre-test exercise self-efficacy questionnaire and a measure of the level of self-perceived health status. Prior to the experiment, the participants were asked to be as honest as possible in their replies. The oldest participant was 80 years old; most of the elderly participants were illiterate or faced difficulties due to farsightedness from old age even if they could read. Therefore, individual interviews were conducted to collect data. After the pre-test, the participants took part in a Tai Chi Chuan (TCC) exercise program and programs from the elderly welfare facility (classes, calligraphy, etc.), respectively. After 24 weeks, exercise self-efficacy questionnaires were administered and the level of self-perceived health status was measured again.

2.2.2 Measurement Tools

2.2.2.1 Exercise Self-efficacy

The tool was developed^{35,36}, and adapted by³⁷. This tool assesses the level of confidence in their abilities to continuously exercise in any situation on a five-point scale, ranging from “not confident at all” with one point and “very confident” with five points; higher points indicate higher levels of self-efficacy. The scale for exercise self-efficacy was composed of 10 questions (one sub-

factor) supported by factor analysis. When the standard goodness of fit was examined to determine if the data were appropriate for factor analysis and the sample was normally distributed, Kaiser-Meyer-Olkin sampling adequacy was .87 and Bartlett’s test of sphericity yielded $X^2 = 711.10$, $df = 45$, $p = .000$, showing significance. Moreover, the Cronbach’s α value was .87 for one factor.

2.2.2.2 Self-Perceived Health Status

The scale of self-perceived health status shows the subjective perception of level of personal health status. This study modified and supplemented the survey by² that utilized³⁸ tool; the tool was reconstructed from the health perception tool from Ware^{39,40}. It consists of three questions that inquire about general health status, level of interruption in daily life, and level of health perception compared to others of the same age, awarding five points for “very much so” and one point for “not at all.” A maximum of 15 points are available, with higher points indicating better self-perception of health status. At the time of tool development, the reliability was measured with Cronbach’s α value at 0.85. The self-perceived health status scale was composed of three questions (one sub-factor) supported by factorial analysis. When the standard goodness of fit was examined to determine if the data were appropriate for factor analysis and the sample was normally distributed, Kaiser-Meyer-Olkin sampling adequacy was .68 and Bartlett’s test of sphericity yielded $X^2=565.75$, $df=3$, $p=.000$, showing significance. Moreover, the Cronbach’s α value was .92 for one factor.

2.2.3 TC Program

Tai Chi exercise is performed three times per week, 50 minutes per session, during 24 weeks. Detailed method of Tai Chi exercise is first, as a warm-up, wrist twist, up and down body stretching with palms looking sky locking fingers together, neck exercise, shoulder exercise, side exercise, waist exercise, lower body exercise with repetition of stand and sit with hands on the knees, ankle twist and joint laxity exercise are performed for 10 minutes, and then, as Tai Chi training exercise, Tai Chi gigong (Yebigong, Kiseigong, Gehapgong, Suwolgong, Pogugong, Susegong) and 10 way of Tai Chi (Kise, Kwongongse, Ryussel Yubo, Yamabunjong, Unsu, Kumgyedokrip, Deunggak, Rapjakmi, Sipjasu, Suse) are performed for 35 minutes, and then, vertical motion and joint laxity exercise are performed for 5 minutes.

2.3 Data Processing and Analysis

The experimental design of this study involved repeated measures two-way ANOVA and post-hoc tests on the groups (TC exercise group, control group) and time (pre-test, post-test). The dependent variables were exercise self-efficacy and self-perceived health status. The statistically significant level on the verification of differences

relating to the study was $p = .05$.

3. Results

This study examined the influence of long-term TC exercise on exercise self-efficacy and self-perceived health levels of the elderly. The study results are indicated in Table 1.

Table 1. The mean and standard deviation of exercise self-efficacy and self-perceived health status for group and measurement times

Factor	Group	Pre-test	Post-test
		M ± SD	M ± SD
Exercise self-efficacy	TC exercise group	10.73 ± .98	21.03 ± 1.79
	Control group	10.90 ± .90	10.80 ± .89
Self-perceived health status	TC exercise group	4.07 ± .69	9.87 ± .82
	Control group	3.97 ± .82	3.93 ± .64

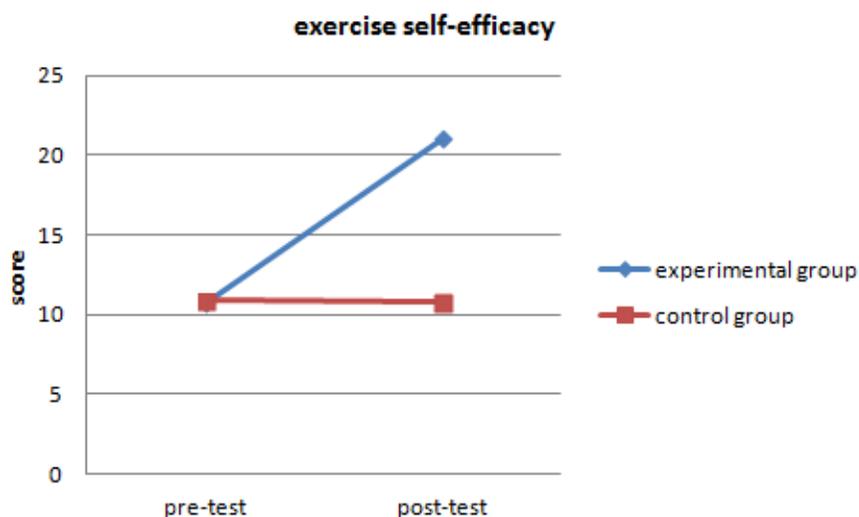


Figure 1. Changes in the scores for exercise self-efficacy for groups and measurement timing.

3.1 Exercise Self-Efficacy

Main effects of group [$F(1, 58) = 387.25, p < .001$] and time [$F(1, 58) = 862.05, p < .001$] were significant. Moreover, the interaction between the group and measurement timing was also significant [$F(1, 58) = 896.18, p < .001$]. When simple main effect analysis was conducted as a post-hoc test of the interaction, the TC exercise group showed higher scores for exercise self-efficacy in the post-test than the pre-test ($p < .001$). However, the control group did not show a statistically meaningful difference between the pre-test and post-test ($p > .05$) (Figure 1).

3.2 Analysis of Self-Perceived Health Status

The analysis of self-perceived health status showed the main effects of group [$F(1, 58) = 448.78, p < .001$] and time [$F(1, 58) = 692.69, p < .001$] were significant. Moreover, the interaction between group and measurement timing was also significant [$F(1, 58) = 708.80, p < .001$]. When simple main effect analysis was conducted as a post-hoc test of the interaction, the TC exercise group showed higher scores for self-perceived health status in the post-test than the pre-test ($p < .001$). However, the control group did not show a statistically meaningful difference between the pre-test and post-test ($p > .05$) (Figure 2).

4. Discussion

This study examined the influence of long-term TC exercise on exercise self-efficacy and self-perceived health status of elderly over the age of 70. Exercise self-efficacy increased in the TC exercise group compared to the control group. These results match⁴¹, reporting that training TC was effective in advancing self-efficacy. Moreover, it is similar to⁴² who reported that TC training, provided in groups, is effective in improving self-efficacy. Thus, regular TC exercise can yield positive changes to the psychological functions of the elderly, who have deteriorated both physically and mentally. Moreover, consistent participation in physical exercise is mutually supportive of elderly self-efficacy; consistent TC exercise was a mediating factor that heavily influenced elderly health improvement. In particular⁴², asserted that self-efficacy played an important role in participating in exercise programs such as TC; self-efficacy could increase with consistent participation encouraged from the beginning of the program, its importance emphasized, and sufficient TC training depending on independent capabilities.

Self-perceived health status increased in the TC exercise group compared to the control group. These results are consistent with⁴³, who asserted that TC exercise had a positive influence improving the elderly's self-per-

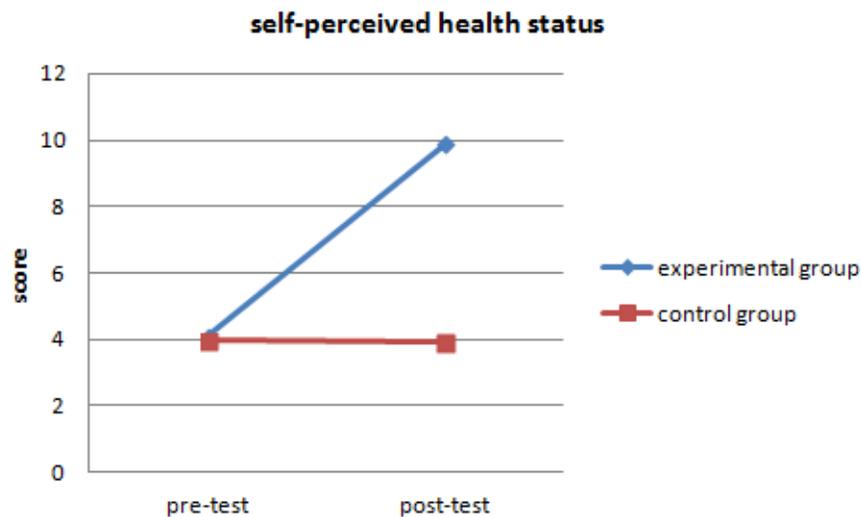


Figure 2. Changes in the scores for self-perceived health status for groups and measurement timing.

ceived health status. It also supports⁴⁴ results, asserting that participation in recreation programs led to positive self-recognition in elderly health status. Moreover⁴⁵, who asserted that dance routine programs led to positive perceptions of health status by the elderly? Moreover, it supports², who asserted that elderly participants of recreational sport activities have more positive perceptions of their health than those who do not participate. It is also similar to⁴⁶, who asserted that regular dance sport programs improved the perceived health status of elderly women. These results indicate that consistent participation in physical activities can help the elderly formulate an understanding that they can improve their health status by participating in such activities. As such, the elderly who consistently participate in physical activities such as TC subjectively perceive their health status as being high, which also indicates that there is a high level of correlation between subjective and actual health.

In summary, long-term TC exercise has a positive influence on exercise self-efficacy and self-perceived health status of the elderly. This seems to indicate that the consistent participation of the elderly in exercise leads to higher self-efficacy and there is higher potential for them to recognize their subjective health as being positive. Approaching their old age, many elderly people experience an aging process that comes with feelings of change and loss in physical, psychological, and social aspects^{47,48}. Such role changes and losses exist in every stage of life; however, role changes and losses from life-cycle changes such as retirement at old age, the death of significant ones, and the growth of children can form the basis of cognitive and mental maladaptation for the elderly⁴⁷. Therefore, researchers^{49,50} assert that this leads to unstable mental states arising from weakening physical and mental functions from aging, loss of socio-economic roles, and alienation from family, friends and others, ultimately leading to lower self-respect, stress, and depression and increased potential for lower quality of life. As such, successful aging relating to the life quality of elders is becoming an increasingly important issue, with consistent participation in physical activities absolutely necessary for the elderly to engage in successful aging. The degrading of physical and mental functions from aging leads to negative results such as higher dependency on others, social isolation and maladaptation, and mental losses; however, active and consistent participation in

physical exercise such as TC can be a method to ease the factors that interrupt successful aging of the elderly.

Future studies should focus on the elderly perception of the importance of engaging in consistent and regular activities, as well as more scientific and structured studies on the type of exercise and exercise methods for the elderly, verifying the effects of a diverse range of physical activities.

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